

General Description

The HSK4N10 is the high cell density trench N-ch MOSFETs, which provide excellent RDS(on) and gate charge for most of the synchronous buck converter applications.

The HSK4N10 meet the RoHS and Green Product requirement with full function reliability approved.

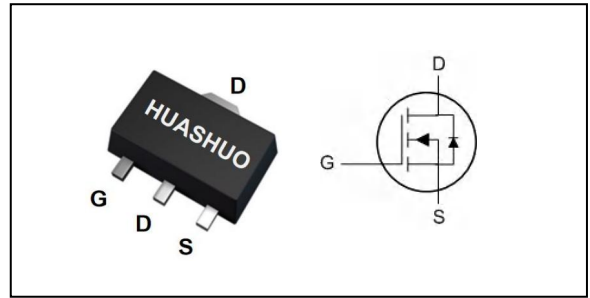
Product Summary

V_{DS}	100	V
$R_{DS(ON),typ}$	150	m Ω
I_D	4	A

Features

- Green Device Available
- Super Low Gate Charge
- Excellent Cdv/dt effect decline
- Advanced high cell density Trench Technology

SOT-89 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_A=25^{\circ}C$	Continuous Drain Current, $V_{GS} @ 10V^1$	4	A
$I_D@T_A=70^{\circ}C$	Continuous Drain Current, $V_{GS} @ 10V^1$	3.2	A
I_{DM}	Pulsed Drain Current ²	16	A
$P_D@T_A=25^{\circ}C$	Total Power Dissipation ³	1.25	W
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}C$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient(steady state) ¹	---	100	$^{\circ}C/W$
	Thermal Resistance Junction-ambient($t < 10s$) ¹	---	75	$^{\circ}C/W$



Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	100	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BVDSS Temperature Coefficient	Reference to 25°C , $I_D=1mA$	---	0.122	---	$V/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V$, $I_D=4A$	---	150	165	$m\Omega$
		$V_{GS}=4.5V$, $I_D=4A$	---	160	175	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1.0	1.6	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.84	---	$mV/^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=80V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	10	μA
		$V_{DS}=80V$, $V_{GS}=0V$, $T_J=55^\circ\text{C}$	---	---	100	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
gfs	Forward Transconductance	$V_{DS}=5V$, $I_D=2A$	1	---	---	S
Q_g	Total Gate Charge (10V)	$V_{DS}=50V$, $V_{GS}=10V$, $I_D=1A$	---	20	---	nC
Q_{gs}	Gate-Source Charge		---	2.9	---	
Q_{gd}	Gate-Drain Charge		---	3	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=50V$, $V_{GS}=10V$, $R_G=3.3\Omega$ $I_D=1A$	---	6	---	ns
T_r	Rise Time		---	4	---	
$T_{d(off)}$	Turn-Off Delay Time		---	20	---	
T_f	Fall Time		---	4	---	
C_{iss}	Input Capacitance	$V_{DS}=50V$, $V_{GS}=0V$, $f=1MHz$	---	690	---	pF
C_{oss}	Output Capacitance		---	31	---	
C_{rss}	Reverse Transfer Capacitance		---	20	---	

Diode Characteristics

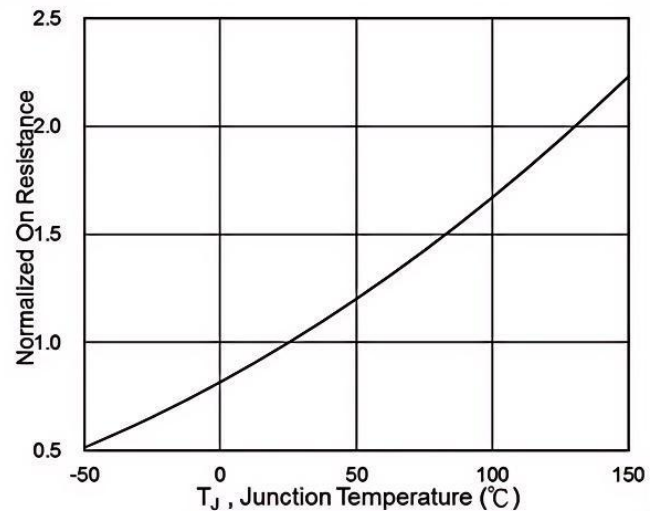
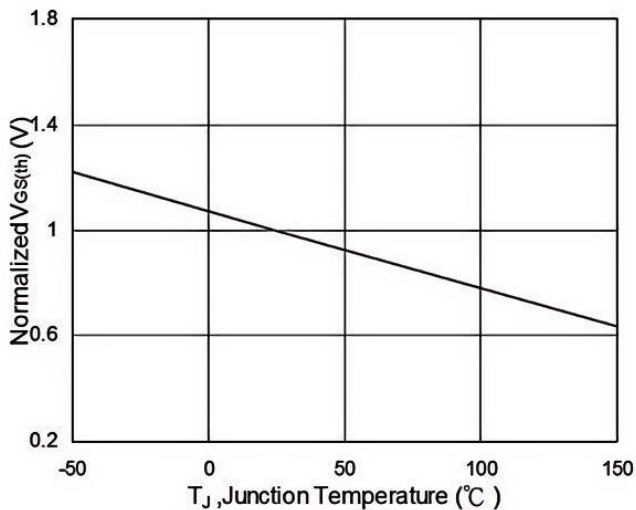
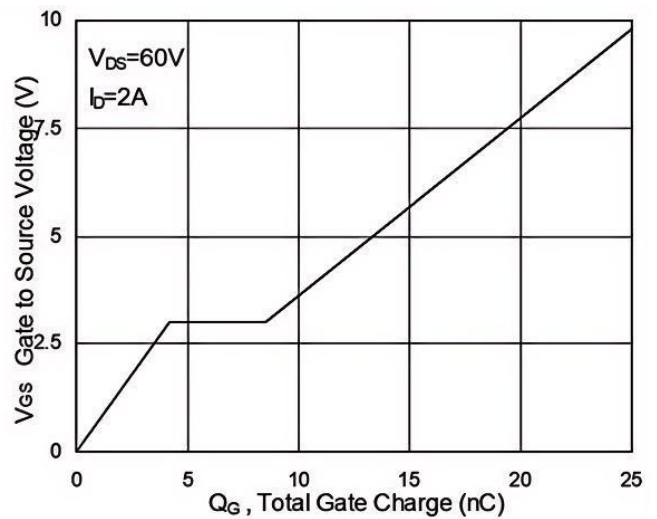
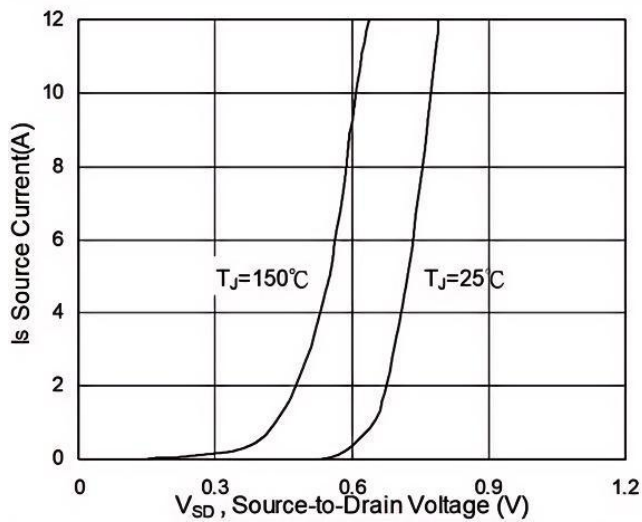
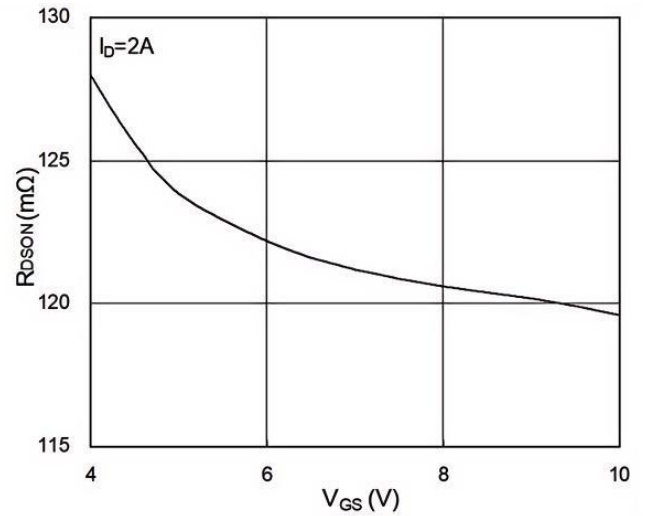
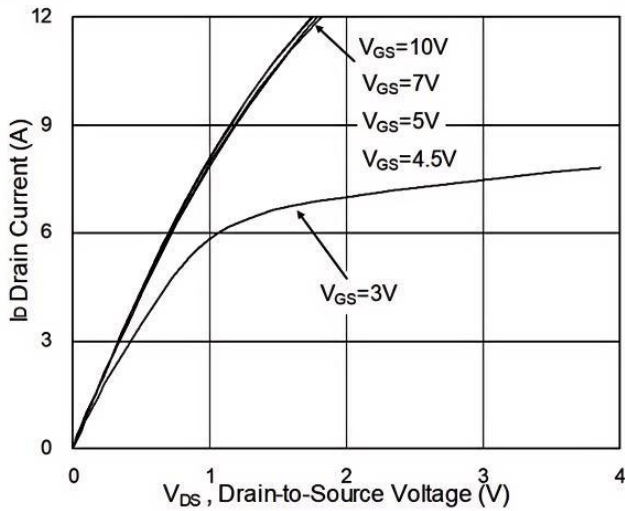
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,4}	$V_G=V_D=0V$, Force Current	---	---	4	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=1A$, $T_J=25^\circ\text{C}$	---	---	1.2	V

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The power dissipation is limited by 150°C junction temperature
- 4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.



Typical Characteristics





N-Ch 100V Fast Switching MOSFETs

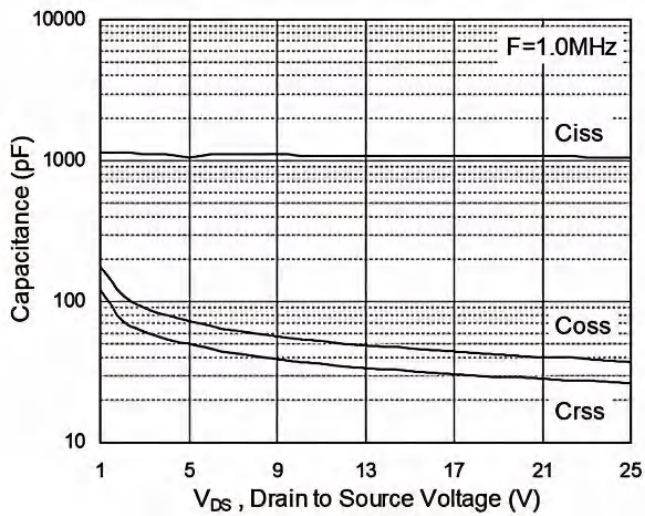


Fig.7 Capacitance

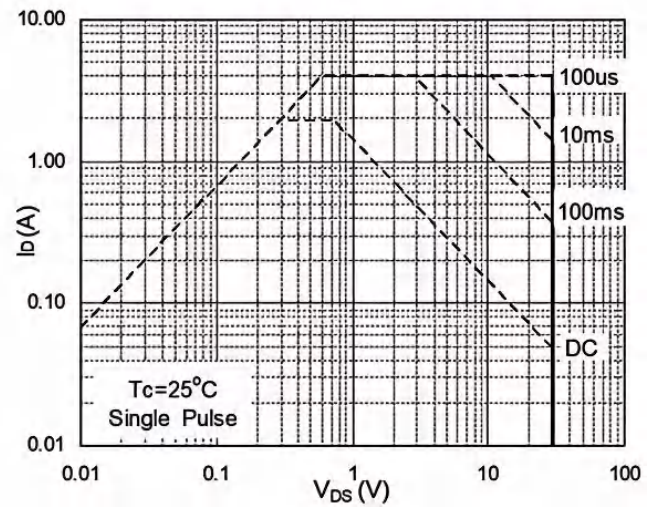


Fig.8 Safe Operating Area

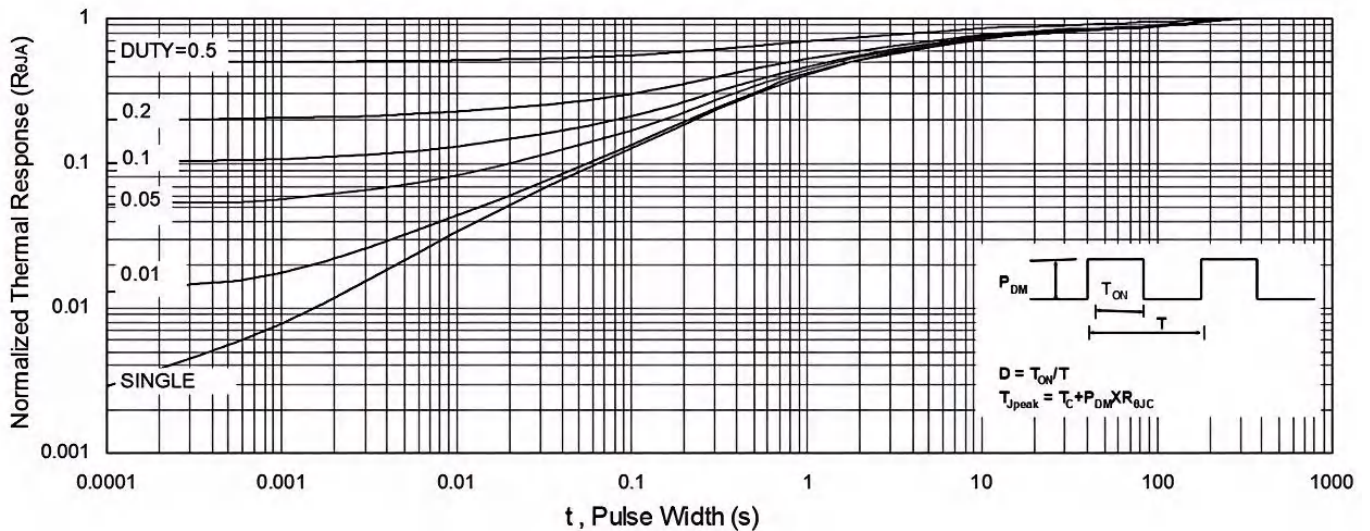


Fig.9 Normalized Maximum Transient Thermal Impedance

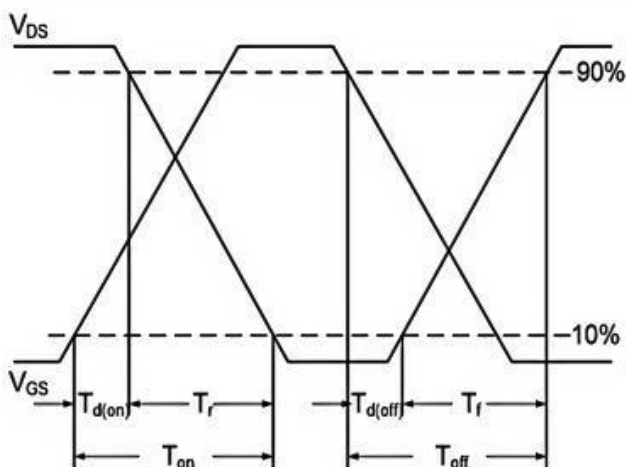


Fig.10 Switching Time Waveform

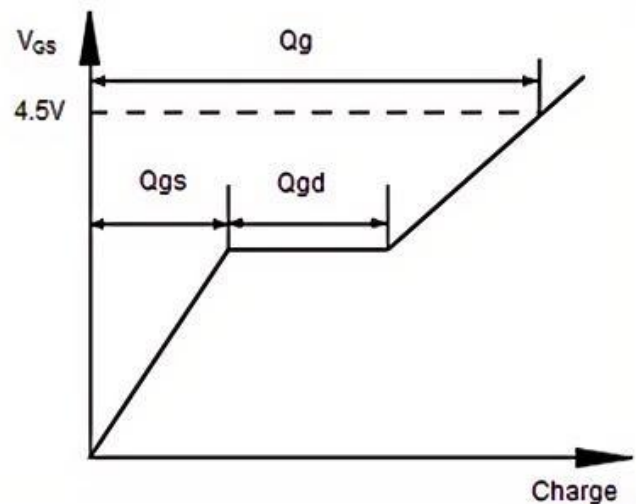


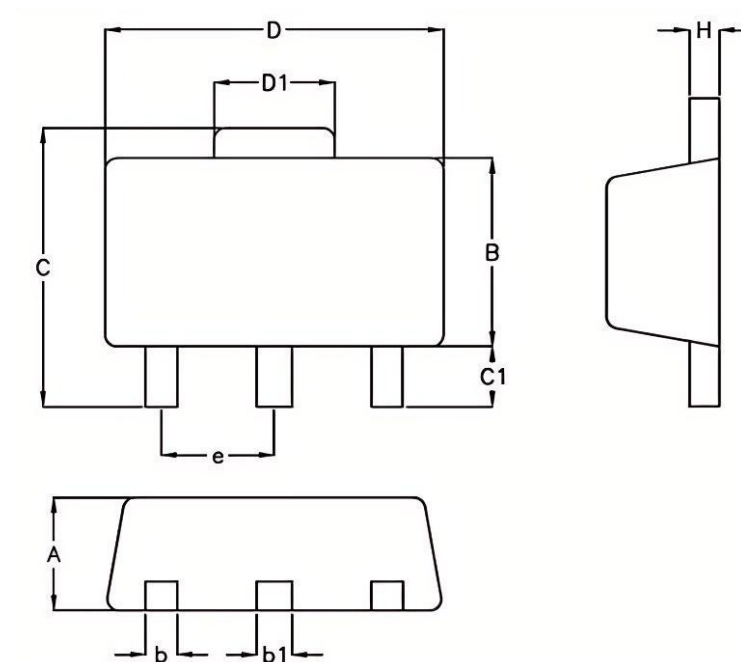
Fig.11 Gate Charge Waveform



Ordering Information

Part Number	Package code	Packaging
HSK4N10	SOT-89	1000/Tape&Reel

SOT-89 Package Outline



SYMBOLS	MILLIMETERS		NCHES	
	MIN	MAX	MIN	MAX
A	1.397	1.600	0.055	0.063
b	0.420	0.540	0.017	0.021
b1	0.420	0.540	0.017	0.021
B	2.388	2.591	0.094	0.102
C	3.937	4.242	0.155	0.167
C1	0.787	1.194	0.031	0.047
D	4.394	4.597	0.173	0.181
D1	1.397	1.753	0.055	0.069
e	1.448	1.549	0.057	0.061
H	0.350	0.44	0.014	0.017



HSK4N10 Marking:

